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WSI
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Division File

0316000067 Coo
Paxton Ave Lag
Sparged/Tech Report

6 February 1990

Steve Gobelman
Illinois Environmental Protection
Agency
Division of Land Pollution Control
Permit Section
2200 Churchill Road
Springfield, Illinois 62706

W.O. No. 1104-05-01

Reference: Agency Contract No. BIE-9035
Paxton Avenue Lagoons Site
Chicago, Illinois - LPC #0316000067

Subject: Final Mini Trial Burn Summary Report

Dear Steve:

Enclosed please find 4 copies of the subject document. Note that some analytical results have not been received from the laboratory (uncontaminated soil - total chlorine; spike solution - total chlorine and PCE; bottom ash/fly ash - semivolatile compounds, etc.). Copies of analytical results will be submitted upon receipt.

There are some samples which were analyzed for parameters not required by IEPA (bottom ash/fly ash - total petroleum hydrocarbon (TPHC) compounds; scrubber blowdown - PCE, TPHC compounds). The analyses were conducted for informational purposes, not as a permit requirement. Results are provided as a courtesy. If a second mini trial burn is required by IEPA, analytical parameters may not be included and is at the discretion of WSI.

If you have any questions or comments, please do not hesitate to contact me at (215) 430-3117.

Sincerely yours,

WESTON SERVICES, INC.

Nancy P. Johnson, P.E.
Project Manager

cc: Jim Janssen
John Noland
Luis Velazquez
Mike Pantaloni
Mike Taylor
Jeff O'Neill
Bob Collins

FINAL MINI TRIAL BURN
SUMMARY REPORT

6 FEBRUARY 1990

PREPARED BY:
WESTON SERVICES, INC.
WESTON WAY
WEST CHESTER, PENNSYLVANIA 19380

W. O. 1104-05-01

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SUMMARY

1.1 INTRODUCTION

Weston Services, Inc. (WSI) is submitting this mini-trial burn test report for a transportable incineration system (TIS) to treat soils contaminated with organic hazardous materials. The TIS is designed to meet the Resource Conservation and Recovery Act (RCRA) incinerator standards specified in Chapter 40 of the Code of Federal Regulations (40 CFR), Part 264 and the Toxic Substances Control Act (TSCA) incinerator performance standards specified in 40 CFR 761.70 (b).

The TIS technology was selected by the Illinois Environmental Protection Agency (IEPA) for remediation of two toxic and/or hazardous waste sites. The first site selected for remediation was the Lauder Salvage Yard, located in Beardstown, Illinois. More than 8,500 tons of PCB-contaminated soil were successfully treated using the TIS. The second site has been identified as the Paxton Avenue Lagoons site, located in Chicago, Illinois (IEPA site number 0316000067). The mini-trial burn test was conducted at the Paxton Avenue Lagoons site on 12 January 1990. WESTON conducted the mini-trial burn and provided the analytical services.

1.2 BACKGROUND

WESTON has designed a TIS to treat soils contaminated with hazardous organic compounds. The TIS employs a two-stage combustion process for incineration of solid wastes. The primary incineration chamber consists of a rotary kiln; the secondary combustion chamber consists of an afterburner. Flue gas exiting the afterburner is further treated by a pollution control system that removes particulate and neutralizes acidic gases. The controlled flue gas emissions are discharged to the atmosphere. The TIS is designed to accommodate 18,000 pounds/hour of soil on a wet basis.

1.3 OBJECTIVE OF THE MINI-TRIAL BURN

The objective of the mini-trial burn test is to ensure that the TIS was reassembled properly by demonstrating it is capable of meeting the following incinerator performance standards for soils contaminated with tetrachloroethylene (PCE):

- Destruction and removal efficiency (DRE) of at least 99.9999 percent.
- Hydrochloric acid (HCl) emissions of less than 4 pounds/hour.

- Particulate emissions of less than 0.08 grains/dry standard cubic foot (dscf) (corrected to 12 percent carbon dioxide).

1.4 EXECUTIVE SUMMARY

The mini-trial burn was conducted at the Paxton Avenue Lagoons site on 12 January 1990. The operational parameters maintained during the mini-trial burn were within the range of values established in WESTON's National TSCA Permit. Mini-trial burn testing was conducted on one day. Stack samples were collected and analyzed for PCE, particulates, and HCl. Three samples were collected for particulates/HCl emissions (60 minutes each in duration); these samples were collected simultaneously with the sample for PCE (about 240 minutes in duration).

A summary of the demonstration test results is presented on Table 1-1. The results indicate that the TIS met and exceeded TSCA (40 CFR 761.70) and Illinois EPA guidelines for air emissions of particulate and PCE while processing an average of 16,100 lbs/hr.

The average acid (HCl) gas emissions of 4.03 lbs/hr exceed the RCRA guidelines for HCl air emissions (4.0 lb/hr). Emissions associated with two of the stack runs were above the established guidelines due to problems with the scrubber (settling of the packing material as discussed in Section 5). Scrubber problems have been corrected.

The incinerator system achieved greater than 99.999905 percent destruction and removal efficiency (DRE) for the mini-trial burn (when corrected to eliminate PCE emissions associated with infiltration air). The emission requirements of less than 0.08 grains/dscf particulate were also met.

The mini-trial burn test was conducted with minor deviations to the sampling and analysis procedures provided in the test plan. (The major deviation consisted of analysis of individual samples for fly ash, as opposed to analysis of composite samples.)

All data presented have passed WESTON's rigorous internal quality assurance and quality control (QA/QC) program. The full QA/QC report is presented in Section 6 of this report.

Table 1-1

Mini-Trial Burn Test Results Summary

Parameters	Results	Regulatory Criteria	Units
Test start	1,100	N/A	Hours (12 Jan 90)
Test end	1,557	N/A	Hours (12 Jan 90)
Average Operating Parameters:			
Soil feed rate	16,100	13,900[1]	lbs/hr
PCE feed rate	270.3	NA	lbs/hr
PCE concentration	16,800	NA	ppm by weight
Fuel feed rate	NR	NA	SCFM
Total thermal load	NR	NA	mm Btu/hr
Gas residence time	2.16	>2.0[1]	seconds
Combustion air flow	6,886	NA	ACFM
Average oxygen	6.76	>5[2]	percent
Average carbon dioxide	8.74	NA	percent
Average carbon monoxide ppm by volume		0.26[3]	>500[1,3]
Combustion efficiency	99.998	>99.9[1]	percent
Scrubber water flow rate	5.0	NA	gallons per minute
Scrubber water pH	10.2	NA	NA
Particulate/HCl Emissions[4]:			
Total sample time	60/60/60	NA	minutes

Table 1-1
(continued)

Parameters	Results	Regulatory Criteria	Units
Total sample volume	35.117/35.861/33.638	NA	DSCF
Stack gas flow rate	7,474/7,264/6,958	NA	DSCF/min
Particulate emissions	0.0118/0.0533/0.0186	<0.08[1]	grains/dscf corrected to 12% CO_2
HCl emissions[5]	2.17/5.22/4.71	<4.0[5]	lbs/hr
HCl removal	99.1/97.8/98.0	NA	percent (corrected)
PCE Emissions:			
Total sample time	10 min/tube pair[6]		minutes
Average PCE feed rate	270.3		lb/hr
Average PCE emission rate	2.571E-04[7,8]		lb/hr
Average PCE DRE	99.9999049[7,8]		percent

NA = Not Applicable
ACFM = Actual Cubic Feet Per Minute
mm = million
PPM = Parts Per Million
DSCF = Dry Standard Cubic Feet
DRE = Destruction and Removal Efficiency

[1]IEPA Permit issued 9 June 1989 (I.D. No. 031600FII).
[2]Permit referenced in footnote 1 indicates 6 percent oxygen; however, in a telephone conversation between WSI and IEPA Division of Air Pollution Control (DAPC) dated 11 January 1990, criteria were changed to 5 percent oxygen.
[3]Corrected to 50 percent excess air.
[4]Values correspond to stack tests 1, 2, and 3.
[5]40 CFR 264.343.
[6]Eight tube pairs collected.
[7]Data do not include tube pairs 6 and 8; surrogate recoveries were outside the acceptable range for these tube pairs.
[8]Corrected to exclude PCE emissions associated with infiltration air.